SPEAKR!

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TOOLS:

- Soldering iron (1)

PARTS:

- Arduino Uno (1)
- ProtoShield (1)
- 9V battery (1)
- 100 ohm 1/4 W resistor (1)
- 8 Ohm mini speaker (1)
- Three-axis Accelerometer (1)
- 200 ft of 22 gauge wire (1)
- Colored electrical tape (1)
- Bubble wrap 3"x2" (for protection in the event of a not-so-smooth landing) (1)
- Wire stripper/crimper (1)
- Female connector header (2)
- kite (1)
- Prototyping PC board (1)

SUMMARY

Nature has a way of speaking to us in a way that soothes and revitalizes. Sounds of the wind in various places create low volume tones that we barely hear. They have a certain

beauty and randomness to them that are unique to nature. We've all heard the wind rustling the leaves, hitting our cars, and, even in its most raw form, moving up against our ears on the beach and in open fields, but have we ever really gotten a chance to hear what the wind would sound like if we analyzed it electronically?

The Powerhouse Pirates have done just that. We modified a simple kite to hold an accelerometer and programmed an Arduino to play tones based on the accelerometer's input. The result is the SPEAKR! (Singing Portable Electronic Arduino Kite - Remix!). If the virtual world had wind, this is what it would sound like. And the best part is that it's cheap to build and easy to adapt! We're going to show you how.
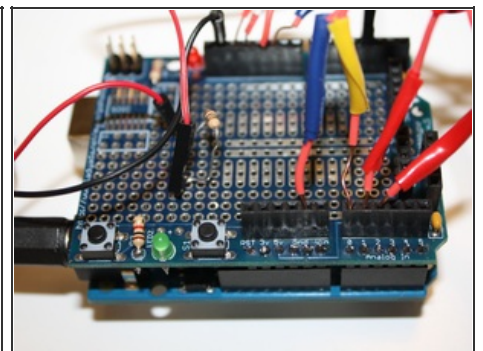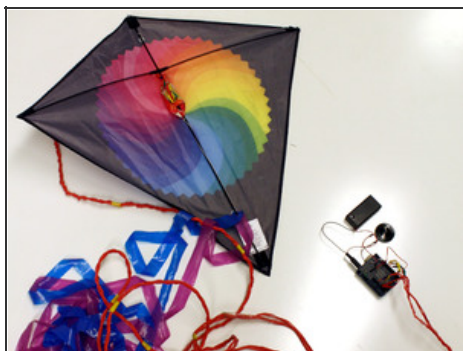
Special Thanks to:

Marcela Zablah

Matt Fuchs

Marc de Vinck

TE Class of '13

Step 1 — SPEAKR!

- Build your Arduino Uno, if you did not purchase it pre-built.
- Solder the Protoshield together.
- Properly attach the Protoshield to the Arduino Uno.

Step 2

- Cut the 200 feet of wire into eight 25ft lines of wire. Our lines were 20ft each.
- Strip the ends of the wire with a wire stripper.
- Label the ends with tape. We found that colored electrical tape worked best.
- Twist the wires together to get a rope-like structure.

Step 3
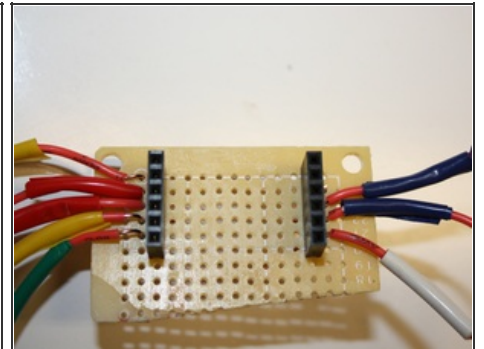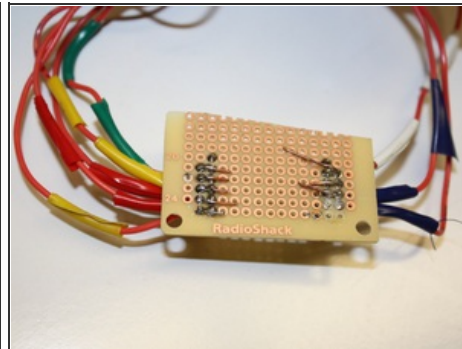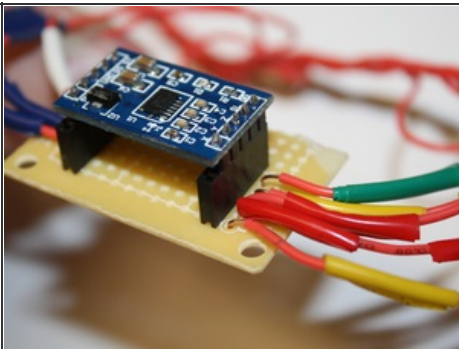
- Solder female headers to PC board.
- Solder wires to the PC board.
- Solder the wires to the headers.
- Cut the PC board (it's pretty big otherwise).
- Snap in the accelerometer. Be sure to write down which wires are going to which ports!

Step 4

- Assemble your kite.
- Poke a hole near the cross of the kite with scissors.
- Feed your rope of wires through the hole.
- Secure the PC board with accelerometer to the kite. We secured it to the long vertical piece, right below the cross.
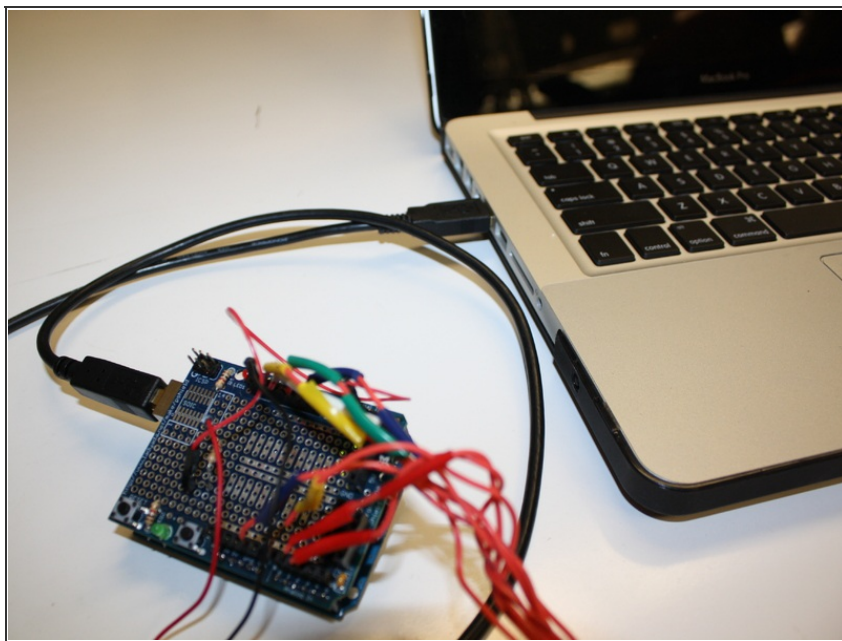
Step 5
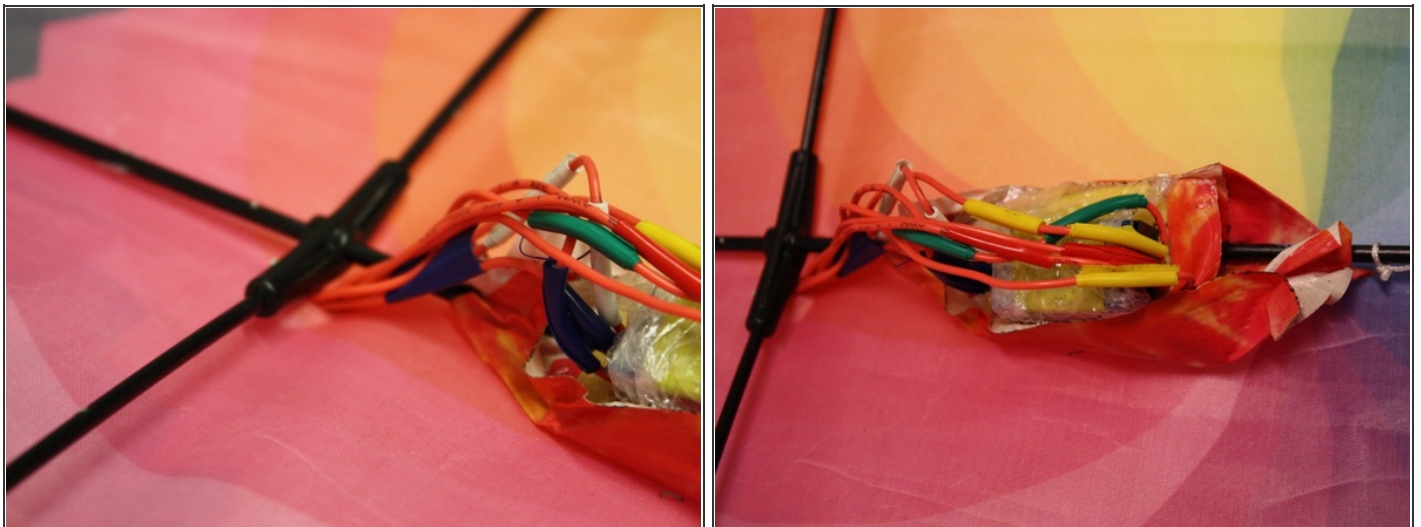
- Here is how we secured the accelerometer:
  - Electrical tape to secure the accelerometer to the PC board.
  - Wrapped bubble wrap around the accelerometer and PC board.
  - Taped the whole thing down with duct tape.

Step 6
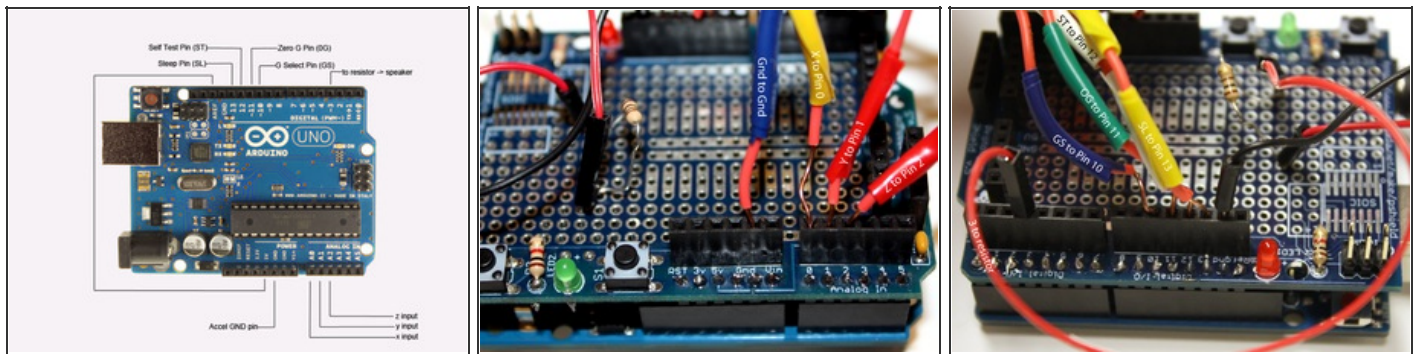
- See the wire schematic in the next step for additional assistance. This directly corresponds to the protoshield header pins.

Step 7

- Though you don't need a computer to run the project itself, programming the Arduino requires some software on a computer. Don't worry, it's all cross-platform and easy to use.
  - Install Arduino software.
  - Add Arduino MMA7361 library, or other if you have a different accelerometer.
  - Upload the attached code to the Arduino board.

Step 8

- Plug in the battery pack. Test and enjoy!

- More content regarding the Powerhouse Pirates and SPEAKR! can be found on our [website](#).

This document was last generated on 2012-11-03 03:24:47 AM.